EXECUTIVE SUMMARY

This environmental assessment (EA) for the California Spaceport, Vandenberg Air Force Base, California, has been prepared in accordance with Air Force Regulation 19-2, Environmental Impact Analysis and the National Environmental Policy Act (NEPA). The major federal actions triggering NEPA in this project are (1) the USAF's proposed lease to WCSC of the Payload Preparation Room at SLC-6 for use as an Integrated Processing Facility and land adjacent to SLC-6 for development of the Spaceport Launch Facility and (2) the possible grant by the DOT of a license to operate a commercial spaceport. The purpose of this EA is to examine the potential for significant environmental impacts resulting from the construction, operation and maintenance of the California Spaceport. The proposed project is to construct and operate facilities to perform commercial space launches of payloads into polar, low earth orbits from South Vandenberg AFB. This would require the adaptation of existing facilities for their new missions and the development and construction of new facilities.

The California Spaceport is needed to provide commercially-owned and -operated space launch facilities for small- to medium-sized launch vehicles and payloads. In order to compete successfully in the growing commercial space market, cost-effective and efficient facilities are required. The Spaceport would contribute to a strong and viable US commercial space program which is able to successfully compete in the international market place.

The Spaceport would be administered by Western Commercial Space Center, Inc. (WCSC) and California Commercial Spaceport, Inc. (CCSI). While the Spaceport would operate as a commercially leased facility, all activities would be conducted within the regulations and procedures of Vandenberg AFB. The transaction is to lease land that is not presently needed for Air Force use (see 10 USC Section 2667) and "excess" launch property to WCSC for development of the Spaceport. The facilities would then be licensed by DOT to operate as a commercial Spaceport.

The location of the proposed action is on South Vandenberg AFB. Preparations of rocket components and payloads would be performed at the Integrated Processing Facility (IPF). The IPF is the former Payload Preparation Room (PPR) at SLC-6. A launch control center and other administrative offices would also be located at the IPF. Final assembly and launch of the rockets and their payloads would be performed at the Spaceport Launch Facility (SLF). Support functions and communications facilities would be provided at the Operations Support Building (OSB) which would be located adjacent to the launch pad.

CCSI proposes to eventually launch up to 24 payloads per year into polar orbit after a phased construction program, which would continue for approximately four years. Some rocket boosters may be used to launch payloads with multiple components. An initial launch capability would be achieved in 1996 and increase to a sustained rate of 24 launches per year by 1999-2000. Eight types or families of launch vehicles would be serviced by the Spaceport. Although one potential launch vehicle would have liquid-fueled rocket motors, most of the rocket motors would be solid fueled. None of these launch vehicles would require the use of sound suppression deluge water.

An alternatives analysis was performed to identify the best location for the Spaceport Launch Facility. North Vandenberg AFB locations are not economically or operationally feasible for the construction of the Spaceport. In particular, facilities on North Vandenberg AFB require launch over the ocean and then a turn to the south for ascent to a polar or near polar orbit. This uneconomical option would be necessary to avoid launching directly over populated areas on Vandenberg AFB. Commercial space operations would not be competitive if such flight profiles were necessary. Three sites were found to be viable locations on South Vandenberg AFB. The viable sites are: (1) the preferred alternative, located 0.49 miles south of SLC-6, (2) the Cypress Ridge alternative, located on the south slope of Cypress Ridge, and (3) the SLC-5 North alternative, located 1,500 feet north of SLC-5. All three sites

were analyzed as possible locations for the Spaceport. Additional alternative sites on South Vandenberg are not available to WCSC. The No-Action Alternative was also considered.

This EA covers modification of existing facilities, construction of new facilities, the preparation and assembly of major components of launch vehicles, preparation for launch, the launch itself, and immediate post-launch activities.

The IPF would be located in the former PPR at Space Launch Complex (SLC-6) on South Vandenberg AFB. This facility would be used for its intended purpose. As such, no impacts are anticipated and there are no alternatives considered for this facility. The preparation and assembly of the launch vehicles would occur inside the IPF. The utility requirements include electricity for lights, use of hoists and elevators, communication access trunks and water for drinking and sanitation. Final assembly and testing, as well as the launch itself, would occur at the SLF.

The existing environment has been described in two EISs which analyzed the Space Shuttle and Titan IV/Centaur programs (USAF 1978, USAF 1989a), as well as in a previous EA for the Lockheed Launch Vehicle (LLV) on South Vandenberg (USAF 1994). South Vandenberg is located in the California Coastal Zone near Point Arguello. The location of the preferred alternative is on a small terrace or plateau, approximately 122 m (400 ft) above the Pacific Ocean, and between the ocean and Santa Ynez Mountains. The terrain is rolling and supports coastal sage scrub and grassland communities. The climate is Mediterranean, which is characterized by warm, dry summers and cool, wet winters. During the summer months, morning fog and inversions are common. The mixing height of the lower atmosphere averages between 900 m (2,950 ft) and 1,350 m (4,430 ft).

The environmental consequences of the Spaceport, for each alternative site, are discussed primarily in terms of construction, the rocket exhaust plume, launch noises, sonic boom effects, and the effects on SLC-6. The potential effects of cold spills and catastrophic events, as well as health and safety issues, are also included. To assist in this evaluation, a “region of influence” has been created that encompasses an area from Point Pedernales to Boathouse Flats in order to assess the impacts contained within the region.

Since extensive environmental analyses have been performed for the Lockheed Launch Vehicle (LLV) and since the LLV is representative of the solid-fueled rocket launching systems which would be serviced by the SLF, this family of launch vehicles has been adopted as the example launch vehicle for this EA. The LLV is based on the Castor 120™, which is typical of solid-fueled launch vehicles which would be serviced and launched from the Spaceport. The LLV 2 is the slowest ascending vehicle and the LLV 3 (with up to six strap on Castor IVAs) is the largest solid fueled vehicle expected to be launched from the SLF. The exhaust constituents from liquid-fueled rockets would primarily consist of CO_2 and H_2O. These compounds would have negligible impacts on the environment. The noise and sonic boom levels of liquid-fueled rocket launches would be similar to those for solid-fueled rockets. Therefore, the LLV represents the maximum potential environmental impacts from launch activities at the SLF. This ensures that all potential impacts have been addressed.

Of the approximately 5.3 ha (13 ac) occupied by the footprint of the Spaceport, 4.6 ha (11.4 ac) of vegetation would be disturbed during construction of the SLF. Losses of coastal sage scrub vegetation would be mitigated by replacement on a 3:1 basis. Several wildlife species of concern are within the region of influence of the preferred alternative site and would be monitored for launch effects. If impacts such as reduced population levels or reduced habitat usage are shown to be caused by rocket launches from the Spaceport, mitigation would be implemented in consultation with VAFB and USFWS. A set of Monitoring and Mitigation Requirements have been generated and would form the basis of a comprehensive program to minimize potential impacts from construction and operation of the Spaceport. These requirements would be the foundation of an agreement between the proponent, the natural resources staff of Vandenberg AFB, and the US Fish and Wildlife Service (USFWS). Approval by the USFWS is required. All mitigation measures identified in the EA, including those in the detailed monitoring and mitigation plan to be developed and implemented

based on the protocols and procedures outlined in Appendix G, would be binding and enforceable obligations of the lessee under the lease of land and facilities from the Air Force to WCSC for development of the Spaceport.

The SLC-6 complex and the Payload Preparation Room (Building 375) have been evaluated and recommended not eligible for inclusion on the National Register of Historic Places (NRHP). If the project is implemented at the preferred alternative site, there is no impact to the historic Anza Trail because it would be outside the viewshed of this resource. Based on background research and fieldwork, no adverse impacts to National Register eligible cultural resources are expected from the proposed Spaceport. Because of the buried nature and proximity of prehistoric sites in the vicinity, monitoring would be conducted during Spaceport construction. Any cultural resources discovered during monitoring would be treated in accordance with 36 CFR 800. Appropriate documentation has been prepared and submitted to the State Historical Preservation Officer (SHPO) for the preferred alternative site. The Cypress Ridge alternative and the SLC-5 North alternative would fall within the viewshed of the Anza Trail. The Cypress Ridge alternative is located within visual range of Pt. Conception. This area is described in Chumash folklore as the passageway, the "Western Gate", through which souls of the dead depart the world. If the Cypress Ridge alternative is chosen for the Spaceport, additional Section 106 (National Historic Preservation Act) compliance would be required to address the issues of the Anza Trail and the Western Gate. If the SLC-5 North alternative is chosen, additional Section 106 would be required to address the Anza Trail issue.

Formal section 7 consultation pursuant to the Endangered Species Act (ESA) has been completed with the National Marine Fisheries Service (NMFS). Impacts to marine mammals on the Channel Islands from sonic booms would not be anticipated. Impacts to harbor seals at Rocky Point would be limited to those associated with launch noises. Harbor seals are known to flush into the water during launches from Vandenberg AFB. Observations made from a nearby location at Vandenberg AFB during a recent Titan IV launch in August 1993 indicated that nearly all of the harbor seals did vacate the haul out area, but the majority of them returned within 24 hours with no identified adverse effects. Previous studies of harbor seal responses to loud noises did not present any evidence of mortality or reduced reproductive rates. The NMFS recommended the initiation of an incidental harassment permit due to the proximity of the haulout area to the preferred alternative site. The permit application process has begun and will be completed prior to first launch.

Public recreation areas, such as Jalama Beach, would not be affected by construction or operation of the Spaceport. A Federal Consistency Determination was submitted to the California Coastal Commission (CCC). The CCC has found the California Spaceport project (CC-42-94) to be consistent to the maximum extent practicable with the California Coastal Management Plan.

No jurisdictional wetlands are located within the footprint of the preferred alternative site. Therefore, there would be no impacts to wetlands from construction of the Spaceport and Section 404, Clean Water Act permitting would not be required. The nearest major drainage is Cañada Honda Creek, which is 3.7 km (2.3 mi) to the north of SLC-6. Since the exhaust plume and launch noise would be directed toward the south of the launch site, there is little chance of cumulative effects from Spaceport launches to Cañada Honda Creek or any other wetland. However, for approximately ten percent of the time during a year winds blow from the south which means that some portion of an exhaust plume may impinge upon Honda Creek. Water quality and vegetation effects would be monitored at Honda Creek during launches where there is a potential for winds from the south.

Formal Section 7 consultation with the US Fish and Wildlife Service (USFWS) under the Endangered Species Act has been initiated. The Biological Opinion from the USFWS would be obtained prior to execution of the lease.

A set of Mitigation and Monitoring Requirements have been developed to form the basis of a comprehensive program minimizing potential impacts to vegetation and wildlife from construction and operation of the Spaceport.

A conformity analysis, in accordance with the Clean Air Act General Conformity Rule, was conducted for potential criteria pollutant emissions for all sources associated with the project. The cumulative project sources were estimated to be within *de minimis* levels for emissions of criteria pollutants.

The Castor 120^{TM} would produce approximately 620 kg (1,367 lb) of exhaust material per second. The LLV 2 is estimated to require 18.4 seconds to reach 914 m (3,000 ft) altitude. Exhaust from these launches would not significantly impact atmospheric resources. The distance to the maximum depositions of Al_2O_3, less than 6850 particles per m^2, would be 3.0 km (1.9 mi) to 6.0 km (3.7 mi). These particles would not pose a health risk, as they would be mostly much greater than 10 microns in diameter. Under typical meteorological conditions, the Rocket Exhaust Effluent Diffusion Model (REEDM) indicates that hydrogen chloride (HCl) concentrations of 5 parts per million for one minute are expected to occasionally trigger the current launch hold criteria. This reflects a recent, more restrictive change in the maximum allowable limits for HCl recommended by the Air Force Armstrong Laboratory. Vandenberg AFB has implemented the Armstrong Laboratory recommendations. The unavoidable consequence of this is greater likelihood of launch holds.

The azimuth of exhaust plume from Spaceport launches under typical weather conditions would range from 153^o to 186^o and the plume width would be less than 2.8 km (1.6 mi). The total duration of this event from launch to a return of ambient conditions would be less than 40 minutes. The localized and transient nature of the exhaust plume and its location over ocean water would not present a significant hazard to population centers, recreation areas, soils, vegetation or wildlife.

With regard to the effects of exhaust plumes, the SLC-5 North alternative site may have the most potential for having a significant impact to the environment. This is due to the close proximity of this site to Cañada Honda Creek.

In summary, in the context of the total space launch program at Vandenberg AFB, the Spaceport would not contribute significantly to the total impact on the human and natural environments at the base. Comprehensive mitigations requirements for the Spaceport project have been established to offset any potential adverse impacts, and reduce net impacts to non-significance. Significant impacts resulting from the addition of environmental effects from Spaceport activities to those of other VAFB programs are not anticipated.